

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Wayne Moreau et al.	Dated: Oct. 5, 2010
Serial Number: 10/597,904	Examiner: Sin J. Lee
Filing date: August 11, 2006	Group Art Unit: 1795
Title: Mixed bases to enhance CAR Profiles on Chrome or Sensitive Substrates	IBM Corporation D/18G, B/321, Zip 482 2070 Route 52 Hopewell Junction, NY 12533-6531

Hon. Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

DECLARATION UNDER 37 C.F.R. 1.131

I, the Applicant in the above-identified patent application, declare as follows:

1. That I am an inventor of the subject matter described and claimed in the above-identified patent application.

2. That prior to December 24, 2003, we conceived of a method of forming a patterned material structure on a substrate, said method comprising:

- (A) providing a substrate with a layer of said material wherein said material is chromium-containing metal composition,
- (B) applying a resist composition to said substrate to form a resist layer on said substrate, said resist composition comprising
 - a) an imaging polymer,
 - b) acid-labile moieties,
 - c) a radiation-sensitive acid generator, and
 - d) a base additive component, wherein said base additive component comprises:
 - (i) a room temperature solid base selected from the group consisting of aromatic amines and imidazoles, and

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- (ii) a liquid low vapor pressure base selected from the group consisting of triethanolamine, wherein a mole ratio of said low vapor pressure base to said solid base is in the range of 0.15 to 0.5,
- (C) patternwise exposing said substrate to electron beam radiation whereby acid is generated by radiation-sensitive acid generator in exposed regions of said resist layer,
- (D) forming a patterned resist structure having a profile with minimal footing by removing radiation-exposed portions of said resist, and
- (E) transferring resist structure pattern to said material layer by removing portions of said material layer through spaces in said resist structure pattern.

3. That the present invention is described in Invention Disclosure FIS8-2002-0222 ("Exhibit A") submitted to the IBM Corporation Intellectual Property Law Department on May 30, 2002 wherein the present invention is specifically described in the "Main Idea" for Invention Disclosure FIS8-2002-0222 ("Exhibit B"). Exhibit B comprises a printed form of the document linked to Exhibit A.

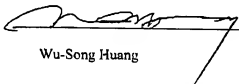
4. That the time and date stamps appearing in Exhibits A and B are automatically generated by IBM Corporation's archival system, and have not been, and can not be, manually input, modified, edited, or changed.

5. That, subsequent to the conception of the invention, and up until the patent application filing date of August 11, 2006, I diligently and actively assisted the IBM Corporation Intellectual Property Law Department in the planning, preparation, review and filing of the above-identified patent application.

Declarant further states that the above statements made of the declarant's own knowledge are true, and that all statements made on information and belief are believed to be true. Declarant makes the above statements with the knowledge that willful false statements and the like are punishable by fine and/or imprisonment, or both, under § 1001 of Title 18 of the United States Code, and that any such willful false statement may jeopardize the validity of this application or any patent resulting therefrom.

Date:

9/30/2010



Wu-Song Huang

Exhibit A



Disclosure FIS8-2002-0222

Prepared for and/or by an IBM Attorney - IBM Confidential

Created By Wayne Moreau On 05/30/2002 01:33:42 PM EDT

Last Modified By wpts1 wpts1 On 03/27/2010 08:46:09 PM CDT

Archived on 04/17/2004

Required fields are marked with the asterisk (*) and must be filled in to complete the form.

* Title of disclosure (in English)

Mixed bases to enhance CAR Profiles on Chrome or Sensitive Substrates

Summary

Status	Final Decision (File)
Final deadline	
Final deadline reason	
Docket family	FIS9-2003-0012
* Processing location	Fishkill
* Functional area	[REDACTED]
Attorney/Patent professional	Steven Capella/Fishkill/IBM
Business Area Manager/IDT Lead	
Evaluators	[REDACTED]
Submitted date	05/30/2002 02:40:13 PM EDT
* Owning division	[REDACTED]
Incentive program	
Lab	
* Technology code	[REDACTED]
Patent value tool (PVT) score	[REDACTED]

Inventors with a Blue Pages entry

Inventors: Wayne Moreau/Fishkill/IBM, Marie Angelopoulos/Watson/IBM, Wu-Song Huang/Fishkill/IBM, David R Medeiros/Watson/IBM, Karen Petrillo/Watson/IBM

Inventor Name	Inventor Serial	Div/Dept	Inventor Phone	Manager Name
> Moreau, WAYNE M.	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Angelopoulos, Marie	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Huang, WU-SONG	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Medeiros, David R.	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Petrillo, Karen E.	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

> denotes primary contact

Inventors without a Blue Pages entry

Invention Development Team Information

Main Idea

To view the Main Idea of this disclosure, open the "Main Idea" document from the view

*Critical Questions (Questions 1-9 must be answered in English)

*Patent Value Tool (Optional - this may be used by the inventor and attorney to assist with the evaluation Evaluation

Search Information

Allocation and Additional Billers

Final Decision

Post Disclosure Text & Drawings

(Form Disclosure, Revised 01-Dec-2006)

Exhibit B



Main Idea for Disclosure FIS8-2002-0222

Prepared for and/or by an IBM Attorney - IBM Confidential

Archived On 09/19/2002 01:01:56 AM

Title of disclosure (in English)

Mixed bases to enhance CAR Profiles on Chrome or Sensitive Substrates

Main Idea

1. Describe your invention, stating the problem solved (if appropriate), and indicating the advantages of using the invention.

The formation of distorted profiles of acid catalyzed (CAR) resist on certain substrates has been attributed to poisoning by basic surface groups or surface energetics which intercept photo or generated acid near the interface and cause "footing" with positive or "coving" with negative resists. (see K Dean et al, SPIE Proceed., 2438,514(1995). Treatment or alteration of the substrate may not be compatible with device or photomask production. We have found suitable compositions in the form of mixed bases in a ketal (KRS) formulation which overcomes a footing issue on chrome photomask and possibly on SION or TiN surfaces known to poison CAR. Individual bases used in KRS did not overcome the footing issue and some base combination especially TBAH or mixed liquid amines did not reduce footing. A particular combination of a liquid and solid amine (see below) achieved almost footless profiles suitable for mask making.

Comparison of Closest Prior Art and This Disclosure

Claims	patent 5985512	Examples in patent	IBM Disclosure	Example
Base 1 VP of	< 2 mm at 100C	triethanolamine(.06 mm) naphthylamine(0.8m m)	liquid amine	triethanolamine(TEA)
Base 2 VP of	2-100 mm at 100C		solid amine- no VP	4-dimethylamino-pyridine(DMAP)
			Solid quarternary amine	TBAH- did not work
			liquid amine	2-dimethylaminopyridine did not work -
Base1 mol ratio to PAG 0.05-0.05	0.05 -0.5		0.03	TEA/TPSTRF
Base 2 mol ratio of 0.05 to 0.5 to PAG	0.01-1.0		0.13	DMAP/TPSTRF
Base 1 to base 2 mol ratio of 1: 0.1 to 1:5	1:0.1 to 1:5		1:4	TEA/DMAP

2. How does the invention solve the problem or achieve an advantage, (a description of "the invention", including figures inline as appropriate)?

This invention requires no substrate treatments or post expose bake (added processing to try and overcome footing) No change in exposure dose and good shelf life was achieved relative to TBAH as base in KRS formulation

3. If the same advantage or problem has been identified by others (inside/outside IBM), how have those others solved it and does your solution differ and why is it better?

US patent(see table above) 5985512 uses a particular blend of low and high vapor pressure(VP) amines which we have found not to reduce footing. This disclosure utilizes a low VP amine and a solid amine(no

VP) to achieve good imaging on chrome for photomask production by electron beam exposure. Oxidation of chrome as suggested by prior art or treatment with acids did not change footing of the CAR on chrome.

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4. If the invention is implemented in a product or prototype, include technical details, purpose, disclosure details to others and the date of that implementation.

Potential

[REDACTED] in second half of 2002).